Societal Determinants of Anemia among Women of Reproductive Age and Role of Community Pharmacist for Its Management

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Authors' contributions

This work was carried out in collaboration among all authors. Author NH designed the study, manage literature review, performed the statistical analysis, wrote the study protocol and the first draft of the manuscript. Author AA wrote study protocol and was involved in proof reading. Authors SSA and WA managed the analysis of the study, literature searches and paper review. All authors read and approved the final manuscript.

Article Information

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ABSTRACT

Aims: To study societal determinants of anemia among women of reproductive age (WRA) and elaborate the role of community pharmacist for its management.
Study Design: To investigate the societal determinants of anemia, a cross-sectional study was conducted in the Muzaffarabad district of AJK, Pakistan.
Methodology: We collected the data from 384 women of reproductive age (15-49 years) having at least one child using a self- constructed interview schedule. The population sample size was calculated using Krejcie formula and purposive sampling was used for data collection. Two hospitals, Abbas Institute of Medical Sciences and combined military hospital Muzaffarabad were selected for blood samples to screen the hemoglobin (Hb) level of the respondents and data collection. Univariate analysis was performed to examine the frequency distributions and

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percentages of cases depending on a single variable at a time. The bivariate analysis was performed using chi-square test to determine empirical relationship between the anemia severity and socio-cultural risk factors of this ailment. The odd ratios were computed to investigate the odds of occurrence of anemia among respondents. The results were considered statistically significant at significance level ≤ 0.05.

Results: The findings revealed that prevalence of mild, moderate and severe anemia are 26.3%, 40.9% and 14.3% respectively among WRA, which shows that anemia is a significant health problem from public health perspective in the region. Major contributing factors are respondent's and her husband's education, age at marriage, number of pregnancies, knowledge about balanced diet and anemia, male preference in food intake and violence.

Conclusion: Anemia is a multifactorial problem among WRA in the study population, which can be dealt with using an integrated approach by combating malnutrition, provision of adequate healthcare, quality education and devising strategies for avoiding domestic violence. The community pharmacists can play an effective role to educate people about the selection of iron supplementation for adequate management of anemia among WRA.

1. INTRODUCTION

Anemia is an endemic health problem among women of reproductive age (WRA) that is connected with the deficiency of red blood cells in the body [1]. The deficiency of the iron and other key nutrients such as folic acid, vitamins (A, C, B12), niacin, pantothenic acid, amino acids and proteins are major causes of anemia [2,3]. Among the WRA residing in the developing countries, anemia is linked with the alleviated prenatal and postnatal complications, premature delivery, increased fetal mortality risk, increased risk of maternal mortality during childbirth and postpartum period [4]. It is estimated that about 50% of all maternal deaths are caused by anemia across the globe [5]. Severe anemia elevates the risk of cardiovascular problems, labor complications and decreases immunity against infections among pregnant women. The children of the anemic mothers are at higher risk of developing anemia compared to children of nonanemic mothers [6].

According to WHO estimates approximately 0.8 billion children and women are suffering from anemia [7]. After Africa, Asia is the second highest region facing the burden of anemia, where about 31.6% (24.1-40.5%) non-pregnant women and 39.3% (31.8-46.5%) pregnant women are victims of this ailment [7,8]. In South Asian countries anemia is a problem of moderate (20.0–39.9%) or severe (≥40%) significance from the public health perspective among WRA [8,9]. Anemia is a moderate public health problem in Maldives and Sri Lanka, whereas it is severe public health problems among WRA in Bangladesh, India and Pakistan [7].

In Pakistan, anemia is equally prevalent among pregnant and nonpregnant women [7,8]. Its prevalence among pregnant women declined 50% to 47.4% from 1990 to 2002, afterwards it started to increase and has reached 51.3% in 2016 [10]. The prevalence of anemia in Sindh is 68%,Baluchistan (48.9%), Punjab (48.6%), AJK (41.0%), Khyber Pakhtunkhwa (KPK) (35.6%) and GB (23.3%) [11]. The iron deficiency among pregnant women is 64%, 73% and 76% in Karachi, Lahore and Multan respectively [12]. Azad Jammu and Kashmir (AJK) is one of the areas where health coverage and facilities are inadequate due to its mountainous topography and long distances from healthcare facilities. Majority of the population (88%) resides in the rural area with limited sources of livelihoods to meet the daily nutritional requirements. Habib et al. [13] reported that anemia is a severe health problem from public health perspective among adolescent girls in AJK, which can be the predisposing factor of this illness among women of reproductive age in this region.

The high prevalence of anemia poses a significant challenge to achieve global target of 50% reduction in anemia among WRA by 2025 in Pakistan. To combat with anemia and its consequences on the physical, mental and reproductive health of the WRA, better understanding of societal determinants of anemia in different parts of the country and timely pharmacological interventions are needed. Hematinics are the drugs which are generally prescribed for the treatment of anemia at an early stage and are also used by women during pregnancy and lactation period [14]. The oral iron supplementations with different types of

preparations such as syrup, tablets ,capsules are available in the market with single fixed combination of micronutrients [14]. The utilization of certain vitamins and minerals influences the absorption of iron in the body. Anemia is a multifactorial health problem and cannot be determined based on the malfunctioning of the biological mechanism of the body. It involves social, economic , nutritional and environmental factors, which affects the vulnerability of an individual to illness. The main aim of this study is to investigate the societal determinants, prevalence and severity of anemia among WRA and to elaborate the role of community pharmacist in educating the consumers about the right dose, right combination and right strength.

The rest of paper is organized as follows. The second section details the material and methods including study design, data collection and analysis. Results and discussions are presented in the third section. Finally, fourth section (conclusion) briefly discussed the major findings of the study.

2. MATERIALS AND METHODS

2.1 Study Design and Data Collection

A cross-sectional study was conducted in district Muzaffarabad, AJK, Pakistan to investigate the societal determinants of anemia among WRA (15-49 years) having at least one child. The respondents were taken from both rural and urban population of the Muzaffarabad district. The sample size was computed using the Krejcie formula [15].

$$n = \frac{\chi^2 NP(1-P)}{d^2(N-1)+\chi^2 P(1-P)} \tag{1}$$

Where n is the estimated sample size, χ^2 is the Chi-square value at degree of freedom ($df = 1$) at confidence interval (3.841). N is the population size, P is the population proportion (0.50) and d indicates the marginal error (0.05). Keeping 95% confidence interval and 5.0% marginal error for the population (N=545817), the sample size was

$$n = \frac{3.8\ 4 \times 454\ 58\ 1 \times 0.5 \times (1-0.5)}{(0.0\ 5)^2(54\ 58\ 1 - 1)+3.8\ 4\ 4 \times 0.5 \times (1-0.5)} = 384 \tag{2}$$

The data of the respondents were collected through a self-constructed interview schedule with the help of properly trained interviewers. Convenience sampling which is a non-probability sampling technique was used for data collection. According to this sampling technique, sample is taken from a group of people easy to contact. A brief description about purpose of the study was provided to the respondents in local language and informed consent was taken for data collection. The respondents were asked questions about their individual, family and societal parameters to accomplish the objectives of the study. The two hospitals, Abbas Institute of Medical Sciences and CMH Muzaffarabad were selected for blood samples to screen the hemoglobin (Hb) level of mother and her last child under the age of five years (in this study only women data is used) as well as for data collection. Severity level was determined by threshold of hemoglobin. The cut-offs of Hb for severe, moderate, mild anemia and normal in non-pregnant women were ≤8.0 g/dL, 8.1-10.9 g/dL, 11-11.9 g/dL and ≥12g/dL respectively. For pregnant women, the Hb level ≤7.0 g/dL, 7.1-9.9 g/dL, 10-10.9 g/dL and ≥ 11 g/dL were taken as severe, moderate, mild anemia and normal respectively [16,17]. The data sheet was prepared in Statistical Package for Social Sciences (SPSS) version 14.0. Before performing the analysis data was checked, cleaned and coded.

2.2 Data Analysis

In this study univariate and bivariate statistical techniques were used for performing data analysis. The univariate analysis was performed for descriptive statistics (frequency distributions and percentage) and bivariate analysis was used for finding the association between dependent variable (anemia severity) and societal determinants of anemia. Chi Square (χ^2) test is absolutely the most used member of the nonparametric family of statistical tests to examine the association of variables. The Chi-Square was determined using the relation.

$$\chi^2 = \sum_{i=1}^{n} \frac{(O_i - E_i)^2}{E_i} \tag{3}$$

"O" represents observed values and "E" shows expected value. The results were considered statistically significant at significant level =.05. We used odd ratios (OR) statistics to quantify the strength of association between two events using the following relation [18].

$$OR = \frac{odds\ of\ an\ event\ occurring\ in\ the\ test\ group}{Odds\ of\ an\ event\ occurring\ in\ the\ reference\ group} \tag{4}$$

OR=1 (same odds of event occurring in the test and reference groups), OR>1 (higher odds of event occurring in the test group than reference group) and OR<1 (odds of event occurring in the test group are lower than reference group). Odd ratios are used to compare the relative odds of the occurrence of anemia (anemic group) and absence of anemia (normal or non-anemic group).

3. RESULTS AND DISCUSSION

In the Fig. 1. distribution of normal and anemic respondents determined based on the hemoglobin (Hb) is shown. Majority of the respondents 313(81.5%) are suffering from anemia and remaining 71 (18.5%) are non-anemic. Out of 313 respondents 101(26.3%) are suffering from mild anemia, 157 (40.9%) moderate anemia and 55(14.3%) severe anemia. The findings aver that anemia is a significant public health problem among WRA in the Muzaffarabad district.

Table 1 shows the results of descriptive and bivariate analysis to reveal the individual characteristics and their association with the anemia among WRA. The respondents are divided into three categories based on their current age. About 30% of women were up to 25 years, nearly 60% are 26 to 35 years and little more than 10% are more than 35 years. Bivariate analysis reveals that anemia is significantly associated with age of the respondent. The odds of occurrence of anemia are 24% and 33% less for respondents whose current ages are 26 to 35 and more than 35 years respectively compared to women whose current ages are up to 25 years. Regarding the age at marriage, little less than 50% women were married at the age up to 18 years, 37.8% were married between 19 to 25 years and remaining 13% were married at the age of more than 25 years. The Chi square values 29.98 reveals highly significant association between age at marriage and prevalence of anemia. The odds of occurrence of anemia are 62% and 68% less among women whose ages at marriage are 19 to 25 and more than 25 years respectively compared to women who married up to the age of 18 years. The results are in line with previous studies that early marriage is a major risk factor of anemia in mother. The mean age of marriage for female in Pakistan is 22 years (Batool, 2010). Majority (28.9%) of women were illiterate followed by 25% having more than 12 years of schooling, 23.4% 9 to 12 years and remaining 22.1% 1 to 8 years of

schooling. Higher values of Chi square 59.16 reveal that education of the respondents is significantly associated with anemia among them. The odds of occurrence of anemia are 39% and 88% less among women whose years of schoolings are 26 to 25 and more than 35 years respectively compared to illiterate women. The study outcomes are in line with the studies [19,20], which reveal that education is a determinantal factor of anemia. The lower prevalence of anemia among educated women may be due to the better understanding of health problems, awareness about advantages of availing timely healthcare services, knowledge about balance diet, consumption of food supplements, intake of iron and improved socio-economic status due to better earning opportunities. Majority of women (74%) are housewives, 17.7% are government employees, 6.3% are self-employed and remaining 2.1% are working in other professions. The results highlight that anemia is less prevalent among government employees. Chi-square value 22.73 shows that profession of the respondent is significantly associated with anemia among the respondents. Odds of occurrence of anemia are 58% and 34% less among government servant and self-employed women respectively compared to housewives. Majority of women (74.7%) have no monthly income and are economically dependent on their husbands, 16.9% earn up to 25000 Pakistani rupees (PKR) and 8.3% earn more than PKR 25000. The results of bivariate analysis reveal that monthly income of the respondent is significantly associated with anemia among them. Odds of occurrence of anemia are 60% and 47% less among women who earn up to PKR 25000 and more than PKR 25000 respectively compared to women who do not earn. Occupation is strongly related to income and is directly associated with the material living standards and enhancing health facilities [21,22]. In AJK, women prefer to perform jobs in government sector and teaching jobs in the private sector. The lower odds of anemia among the government employees may be due to the fact that they are educated, economically independent, consume nutritious food and utilize better healthcare services.

Table 1 also reveals that number of pregnancies, regularity of menstrual periods and heavy blood loss are significantly associated with anemia among respondents. Regarding number of pregnancies, 37.5 % respondents had 1 to 2, 35.4% had 3 to 4, 15.4% had 5 to 6 and remaing 11.7% had more than 6 pregnancies. The

prevalence of severe anemia is exceptionally high among women, who had more than six pregnancies. The odds of occurrence of anemia are 1.36, 2.05 and 6.09 times more among women whose number of pregnancies are 3 to 4, 5 to 6 and more than 6 respectively compared to women whose number of pregnancies are 1 to 2. The results of the study also aver that irregular menstruation and heavy blood loss are the determinants of severe anemia among women. The findings are consistent with previous studies which identified that repeated pregnancies are highly associated with the prevalence of anemia among married women [19,23,24,25]. Little less than one-third of the respondents are consuming nonfood items (pica). consumption of pica is significantly associated with anemia among respondents. Higher odds of severe anemia were found among women who consumed pica. The proportion of women consuming food and iron supplements are 14.6% and 17.2%. Odds of occurrence of anemia were 1.22 and 1.23 times more among women who are not consuming food and iron supplements respectively. Knowledge about a disease, its detrimental factors, various symptoms, preventive measures and compulsory efforts are vital for devising the treatment and therapeutic interventions of any disease. The results presented in Table 1 show that knowledge of the respondents about balanced diet, anemia as a health problem, anemia symptoms, causes and preventive strategies are significantly associated with anemia among respondents. The odds of occurrence of anemia are 2.76, 1.99, 3.31,3.94 and 3.23 times more among women who do not have knowledge about balanced diet, anemia as a health problem, anemia symptoms, causes and preventive measures respectively.

In Table 2 results of the descriptive and bivariate analysis to reveal the family and community factors of anemia and their association with prevalence of anemia among WRA are presented. Husband's education, profession and monthly income were investigated to study the effect of socio-economic status of the husband on the prevalence of anemia in women. Educational status of the respondent's husbands was categorized into illiterate, 1 to 8, 9 to12 and 12+ years of schooling. The results revealed significantly high association (Chi-square=30.17 and significance level <.0005) between anemia and educational attainment of the respondent's husband. Odds of occurrence of anemia are 13%, 20% and 80% less among women, whose husband's years of schooling are 1 to 8, 9 to 12

and 12+ years respectively compared to women of illiterate husbands. Occupation is strongly related to income and is directly associated with the material living standards and utilization of health facilities [21,22]. The husband profession and monthly income were also significantly associated with anemia among women. Compared with government employees, odds of occurrence of anemia are 10% less among wives of businessmen, 4.65 and 1.75 times more among wives of laborer and other occupations. The findings clearly elucidate that socio-economic status of the respondent husband is linked with anemia. Regarding economic wellbeing, we found statistically significant association of severe and moderate anemia with family monthly income of the respondent. Compared to women whose husbands do not have any income odds of occurrence of anemia are 53%, 60% and 72% less among women whose husbands earn PKR 10001- to 25000, 25001 to 50000 and more than 50000 respectively. The results are consistent with several studies conducted across the globe and in Pakistan [6,19,26,27,28,29]. Gender preference is a complex phenomenon and it exists in various forms across different cultures in Pakistan [30]. In the male dominant society, male members are given more preference in food intake and power of decision making as compared to female. About 54.2% women reported that male members are given preference in food intake. Chi square value 72.84 and significance level <.0005 reveal that prevalence of anemia is significantly high among women who reported male members are given preference in food intake. The odds of occurrence of anemia are 66% less among women who reported that male members are not given preference in food intake. Thus, equal opportunities in food intake can be helpful in reducing anemia among WRA in AJK. Domestic violence is a rampant and most underreported form of violence committed against women in Pakistan [31]. According to Pakistan demographic and health survey 2012-13, 32% WRA have faced physical violence since the age of 15 years and 19% faced it during last year prior to survey [31]. In this study we asked the women about prevalence of physical and mental violence experienced by them from husband. Regarding psychological violence, 28.1% reported not at all, 50.8% few times and 21.1% frequently. Both physical and mental violence are significantly associated with the anemia among respondents. The odds of occurrence of anemia are 5.12 and 13.18 times more among women,

Table 1. Descriptive and bivariate analysis to reveal the individual characteristics and their association with anemia severity among respondents.

Variables	Category	Frequency (%)					Chi-Square	Odd Ratios
		Normal	Anemic					
			Mild	Moderate	Severe	Total		
Age	Up to 25	18(15.5)	33(28.4)	56(48.3)	9(7.8)	116(30.2)	13.75*	Reference
	26 to 35	44(19.5)	56(24.8)	91(40.3)	35(15.5)	226(58.9)		0.76
	35+	9(21.4)	12(28.6)	10(23.8)	11(26.2)	42(10.9)		0.67
Age at marriage	Up to 18	21(11.1)	44(23.3)	84(44.4)	40(21.2)	189(49.2)	28.98**	Reference
	19 to 25	36(24.8)	41(28.3)	57(30.2)	11(7.6)	145(37.8)		0.38
	25+	14(28)	16(32)	16(32)	4(8)	50(13.0)		0.32
Education	Illiterate	12(10.8)	26(23.4)	44(39.6)	29(26.1)	111(28.9)	59.16***	Reference
	1 to 8	8(9.4)	26(30.6)	33(38.8)	18(21.2)	85(22.1)		1.17
	9 to 12	15(16.7)	21(23.3)	47(52.2)	7(7.8)	90(23.4)		0.61
	12+	36(36.7)	28(28.6)	33(33.7)	1(1)	98(25)		0.12
Profession	Housewife	42(14.8)	77(27.1)	117(41.2)	48(16.9)	284(74.0)	22.73*	Reference
	Government Servant	20(29.4)	19(27.9)	27(39.7)	2(2.9)	68(17.7)		0.42
	Self Employed	5(20.8)	3(12.5)	11(45.8)	5(20.8)	24(6.3)		0.66
	Others	4(50)	2(25)	2(25)	0(0)	8(2.1)		0.17
Monthly income	No income	43(15)	78(27.2)	118(41.1)	48(16.7)	287(74.7)	13.92*	Reference
	Up to 25000	20(30.8)	14(21.5)	25(38.5)	6(9.2)	65(16.9)		0.40
	25000+	8(25)	9(28.1)	14(43.8)	1(3.1)	32(8.3)		0.53
Number of pregnancies	1 to 2	35(24.3)	51(35.4)	50(34.7)	8(5.6)	144(37.5)	71.72***	Reference
	3 to 4	26(19.1)	33(24.3)	65(47.8)	12(8.8)	136(35.4)		1.36
	5 to 6	8(13.6)	12(20.3)	26(44.1)	13(22)	59(15.4)		2.05
	6+	2(4.4)	5(11.1)	16(35.6)	22(48.9)	45(11.7)		6.09
Menstrual periods	Regular	55(18.9)	82(28.2)	121(41.6)	33(11.3)	291(75.8)	9.32*	Reference
	Irregular	16(17.2)	19(20.4)	36(38.7)	22(23.7)	93(24.2)		1.12
Heavy blood loss	Yes	10(14.5)	17(24.6)	24(34.8)	18(26.1)	69(18)	9.70*	Reference
	No	61(19.4)	84(26.7)	133(42.2)	37(11.7)	315(82)		0.60

Variables	Category	Frequency (%)					Chi-Square	Odd Ratios
		Normal	Anemic					
			Mild	Moderate	Severe	Total		
Consume non-food items	Yes	14(11.3)	35(28.2)	47(37.9)	28(22.6)	124(32.3)	14.50**	Reference
	No	57(21.9)	66(25.4)	110(42.3)	27(10.4)	260(67.7)		0.45
Consumption of food supplements	Yes	9(16.1)	20(35.7)	23(41.1)	4(7.1)	56(14.6)	4.78^{ns}	Reference
	No	62(18.9)	81(24.7)	134(40.9)	51(85.4)	328(85.4)		1.22
Iron Supplementation	Yes	14(21.2)	17(25.8)	29(43.9)	6(9.1)	66(17.2)	2.03^{ns}	Reference
	No	57(17.9)	84(26.4)	128(40.3)	49(15.4)	318(82.8)		1.23
Knowledge about balanced diet	Yes	47(26.6)	48(27.1)	70(39.5)	12(6.8)	177(46.1)	24.81**	Reference
	No	24(11.6)	53(25.6)	87(42)	43(20.8)	207(53.9)		2.76
Knowledge about anemia	Yes	40(24.5)	38(23.3)	66(40.5)	19(11.7)	163(42.4)	7.98*	Reference
	No	31(14)	63(28.5)	91(41.2)	36(16.3)	221(57.6)		1.99
Knowledge about anemia symptoms	Yes	33(33.7)	25(25.5)	32(32.7)	8(8.2)	98(25.5)	22.10**	Reference
	No	38(13.3)	76(26.6)	125(43.7)	47(16.4)	286(74.5)		3.31
Knowledge about anemia causes	Yes	30(38)	19(24.1)	26(32.9)	4(5.1)	79(20.6)	28.11***	Reference
	No	41(13.4)	82(26.9)	131(43)	51(16.7)	305(79.4)		3.94
Knowledge about anemia prevention	Yes	27(35.1)	19(24.7)	27(35.1)	4(5.2)	77(20.1)	20.80**	Reference
	No	44(14.3)	82(26.7)	130(42.3)	51(16.6)	307(79.9)		3.23

Significance level: ≤ .05*; ≤ .005**; ≤ .0005*** , not significant (ns)

Table 2. Descriptive and bivariate analysis to reveal the family and community determinants and their association with anemia severity.

Variables	Category	Frequency (%)					Chi-Square	Odd Ratios
		Normal	Anemic					
			Mild	Moderate	Severe	Total		
Husband's education	Illiterate	7(12.1)	10(17.2)	26(44.8)	15(25.9)	58(15.1)	30.17***	Reference
	1 to 8	11(13.6)	20(24.7)	34(42)	16(19.8)	81(21.1)		0.87
	9 to 12	21(14.6)	45(31.3)	59(41)	19(13.2)	144(37.5)		0.80
	12+	32(31.7)	26(25.7)	38(37.6)	5(5)	101(26.3)		0.30
Husband's profession	Unemployed	0(0)	2(25)	4(50)	2(25)	8(2.1)	22.69*	-
	Government servant	34(21)	47(29)	66(40.7)	15(9.3)	162(42.2)		Reference
	Businessmen	28(22.6)	28(22.6)	53(42.7)	15(12.1)	124(32.3)		0.90
	Laborer	2(5.4)	8(21.6)	16(43.2)	11(29.7)	37(9.6)		4.65
	Others	7(13.2)	16(30.2)	18(34)	12(22.6)	53(13.8)		1.75
Husband monthly income	No Income	1(11.1)	3(33.3)	3(33.3)	2(22.2)	9(2.3)	15.22▪	Reference
	Up to 10000	11(9.2)	32(26.9)	54(45.4)	22(18.5)	119(31)		1.23
	10001 to 25000	29(20.9)	34(24.5)	57(41)	19(13.7)	139(36.2)		0.47
	25001 to 50000	21(23.9)	24(27.3)	33(37.5)	10(11.4)	88(22.9)		0.40
	50000+	9(31)	8(27.6)	10(34.5)	2(6.9)	29(7.6)		0.28
Family monthly income	Up to 10000	6(7.8)	19(24.7)	36(46.8)	16(20.8)	77(20.1)	17.93*	Reference
	10001 to 25000	26(17.2)	42(27.8)	59(39.1)	24(15.9)	151(39.3)		0.41
	25001 to 50000	19(21.8)	22(25.3)	34(39.1)	12(13.8)	87(22.7)		0.30
	50000+	20(29)	18(26.1)	28(40.6)	3(4.3)	69(18)		0.21
Male preference in food intake	Yes	25(12)	34(16.3)	95(45.7)	54(26)	208(54.2)	72.84***	Reference
	No	46(26.1)	67(38.1)	62(35.2)	1(0.6)	176(45.8)		0.34
Physical violence	Not at all	62(27.9)	82*36.9)	69(31.1)	9(4.1)	222(57.8)	124***	Reference
	Few Time	8(6.3)	17(13.4)	75(59.1)	27(21.3)	127(33.1)		5.12
	Frequently	1(2.9)	2(5.7)	13(37.1)	19(54.3)	35(9.1)		13.18
Mental violence	Not at all	36(33.3)	45(41.7)	23(21.3)	4(3.7)	108(28.1)	150.14***	Reference
	Few Time	33(16.9)	51(26.2)	100(51.3)	11(5.6)	195(50.8)		2.45
	Frequently	2(2.5)	5(6.2)	34(42)	40(49.4)	81(21.1)		19.75

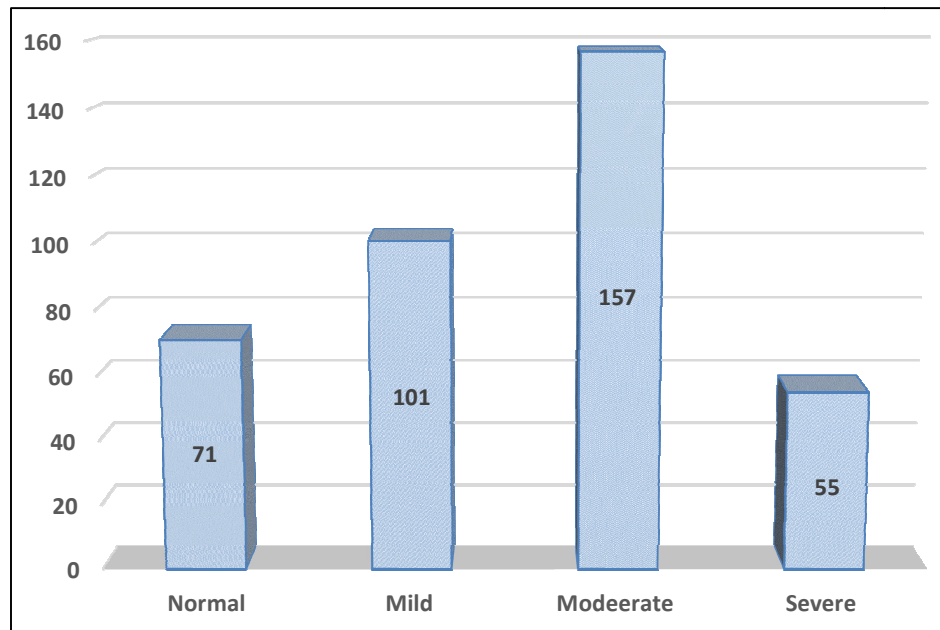*Significance level: ≤ .05*; ≤ .005**; ≤ .0005***

Fig. 1. Distribution of the normal and anemic respondents

Who are suffering from physical violence few times and frequently respectively compared to those who are not victims of this violence. Compared to non-victims of mental violence, the odds of anemia are 2.45 and 19.75 times more among women suffering from the violence few times and frequently respectively. The degree of controlling behavior exercised by husbands is the precursor of violence, which affects the physical and mental health of women.

The findings of the study demonstrate that the magnitude of anemia prevalence is very high among respondents. The major individual contributors of anemia include respondent's education, age at marriage, number of pregnancies and inadequate knowledge about balanced diet and anemia. The major family and community contributing factors include husband education, male preference in food intake, physical and mental violence. The anemia in the study population can be prevented by using foods that are iron rich including both haem iron and non-haem iron as well as iron supplementation. Very small number of the respondents are consuming food and iron supplements. The women also reported that they are not provided information about the proper dose of iron supplementation. World health organization has recommended the daily oral iron dose of 30–60 mg and folic acid

supplementation 400 μg for preventing anemia during pregnancy in areas of anemia prevalence ≥20% whilst for adolescent girls and non-pregnant women recommended weekly dose is 60mg iron and 2800 μg folic acid [32]. As anemia is a significant health problem (prevalence ≥40%), the role of community pharmacist can be crucial to educate the anemic people about the selection of more efficient supplements, administer food-food interaction, food-drug interaction that affect iron absorption.

4. CONCLUSION

The present study was conducted to identify which societal determinants are major contributing factors of anemia among WRA in the region. The requisite information collected from WRA having at least one child revealed that anemia is a severe public health problem among women folk in AJK. The empirical findings aver that major contributing factors are education of respondent and her husband, age at marriage, number of pregnancies, knowledge about balanced diet and anemia, male preference in food intake and violence. We found statistically significant results. The government needs to take concrete measures to drastically decrease anemia in the vulnerable groups and treat its underlying causes. An integrated approach is needed to prevent anemia by combating

malnutrition, creating awareness about balanced and iron rich diet, reducing poverty, provision of adequate healthcare, providing quality education for female and devising strategies for avoiding domestic violence. The community pharmacists can also play a vital role with depth knowledge and experience to guide people about the rights and wrongs of iron supplementation to improve the drug efficacy.

CONSENT

Informed consent was taken from the respondents before data collection.

ETHICAL APPROVAL

The study approved by the advanced studies and Research Pir Mehr Ali Shah Arid Agriculture University Rawalpindi. A brief description about purpose of the study was provided to the respondents in local language and informed consent was taken for data collection.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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